A Dissertation on

CORNEAL AND LENTICULAR PIGMENTATION FOLLOWING LONG TERM CHLORPROMAZINE THERAPY AND ITS SIGNIFICANCE IN CAUSING VISUAL DEFECTS

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CERTIFICATE

Certified that this dissertation entitled **"CORNEAL AND LENTICULAR PIGMENTATION FOLLOWING LONGTERM CHLORPROMAZINE THERAPY AND ITS SIGNIFICANCE IN CAUSING VISUAL DEFECTS"** is the bonafide work by **Dr. V. Sathish,** Post Graduate student, done under my guidance and supervision during the period June 2004 to March 2007 in partial fulfillment for the award of M.S.Degree (Ophthalmology) of the Tamil Nadu Dr. M.G.R. Medical University.

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CONTENTS

Page No.

PART - 1

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INTRODUCTION

For a clear image to be formed on the retina, the transparency of cornea and lens is essential. Cornea contributes to two-thirds of refractive power and lens to one- third of refractive power.

In the visible range of spectrum (380 to 760 nm), the cornea transmits almost 100% of light energy. This transparency is due to

I. ANATOMICAL FACTORS

a) Avascularity of cornea

b) Absence of pigment in the cornea

c) Demyelinated nerve supply

d) Regular arrangement of epithelial and endothelial cells

e) Regular arrangement of stromal collagen fibres

f) Paucity of cells in stroma

g) Epithelial cells are non-keratinised

h) Anterior surface of tears helps in forming a regular refractive surface

II. RELATIVE DEHYDRATION OF THE STROMA MAINTAINED BY

a) Epithelium, which is largely impermeable to water

b) Endothelial transport system to pump fluid from the corneal stroma to the aqueous by Na –K ATPase mechanism.

c) Special intercellular junction in endothelium

III. MAINTENANCE OF NORMAL INTRAOCULAR PRESSURE

The lens is a transparent crystalline structure, covered by a homogenous capsule and has epithelium only beneath the anterior capsule. It transmits almost 80% of light energy. Its transparency is due to

i) Sparsity of cells

ii) Single layer of epithelial cells, which is not thick

iii) Close alignment of individual cells

iv) Impermeable character of the lens capsule

v) Avascularity

vi) Same index of refraction in all parts of the lens

vii) Pump mechanism of the lens fibre membranes, which maintains relative dehydration of the lens

viii) Auto-oxidation – High concentration of reduced glutathione in the lens, maintains the lens proteins in a reduced state and ensures the integrity of cell –membrane pump.

Opacities or pigmentation affecting transparency of cornea and lens occurs as a result of aging and usage of drugs.

There are certain psychotic, Rheumatological, Collagen Vascular, Dermatological, Immunological, Cardiac conditions requiring drug therapy for a shorter or longer period of time. These group of drugs have a tendency to cause corneal and lenticular opacities or pigmentation which may or may not affect vision.

The prevalence of mental illness in general population is 9-10%, & for schizophrenia it is 1%. Other than schizophrenia, condition like mental retardation with behavioural problems, substance induced psychosis (cannabis, alcohol), certain types of manic depressive psychosis requires long term treatment with chlorpromazine inspite of newer anti -psychotic drugs .

There are reported incidence of corneal and lenticular pigmentation following long term chlorpromazine therapy which usually does not affect vision.

To perform social responsibilities, mentally ill patients need to have an independent life pattern to carry on their own duties.

I selected this topic to evaluate the incidence of corneal and lenticular pigmentation or opacity with dose and duration of long term chlorpromazine therapy and its significance in causing visual defects.

DEVELOPMENT OF CORNEA AND DRUG RELATED CORNEAL OPACITIES OR PIGMENTATION

Cornea develops from interaction of surface ectoderm derived epithelium and neural crest derived mesenchyme, which gives rise to deeper layers including Bowmans layer, stroma, endothelium and its thick basal lamina, Descemet's membrane.

Photosensitising agents absorb visible and UVrays and as a result generate free radicals. These photosensitizing agents may become bound to macromolecules in the cornea, lens and retina which also act as drug depots. Once the therapeutic agent has circulated through uveal tract into aqueous, it can rapidly penetrate the corneal epithelium and deposit in the stroma, or if lipophilic, it accumulates in the corneal epithelium.

DEVELOPMENT OF LENS, AGE RELATED AND DRUG RELATED OPACITIES OR PIGMENTATION ON LENS

The normal human lens originates from a double layer of epithelium . Its thickened outer basal lamina (the capsule) is analogous to Descemet's layer. The lens grows to become a thick, flexible tissue composed of cells densely packed with clear protein known as crystallins. By the age of 50 yrs, flexibility is reduced, thus diminishing the accommodation. The capsule reaches the thickness of several microns anteriorly and is ten times thinner posteriorly.

The anterior lens epithelium is the most active region metabolically conducting cation transport and cell division. The region is also the most prone to damage from drugs or toxic substances.

The lens grows with age and colouration or opacities may develop and interfere the vision. Cataract formation may be enhanced by miotics, steroids, and phenothiazines.

The eye because of its rich blood supply and relatively small mass, exhibits an unusually high susceptibility to toxic substances. Drug molecule present in systemic circulation can reach ocular structures by way of the uveal or retinal vasculature, once in the eye drugs and chemicals can be deposited in several anatomic sites acting as drug deposits such as cornea, lens, and retina.

The binding ability of drugs to melanin can lead to ocular toxicity. The free radical nature of melanin which is present in ocular tissue such as uveal

tract and retinal pigment epithelium may contribute to binding capacity of drug such as chlorpromazine and haloperidol.

DRUGS CAUSING CORNEAL DEPOSITS OR OPACITIES OR PIGMENTATION

A. CHLOROQUINE AND HYDROXYCHLOROQUINE

i. EARLY STAGE

Diffuse, Punctate deposits appear in the corneal epithelium.

ii. LATE STAGE

Deposits aggregate into curved line that converge and coalesce below the central cornea.

iii. FINAL STAGE

Green, Yellow pigmented lines appear in the centre of the cornea as a whorl like opacity.

Visual acuity usually remains unchanged on discontinuation of the therapy both subjective and objective corneal signs disappear.

Keratopathy occurs in 30% to 75% of patients treated with either chloroquine or hydroxychloroquine, but corneal change are found much less frequently in patients treated with hydroxychloroquine.

Corneal deposits observed as early as 2 to 6 weeks after beginning therapy and there is no relationship between the development of corneal deposits and the occurence of retinopathy.

The origin of the corneal opacities appears to be due to reversible binding of the drug to intra cellular nucleo proteins. The changes are limited to the corneal epithelium, which the drug may reach by deposition in tear film or limbal vasculature.

B) CHLORPROMAZINE

The pigmentation is white, yellow-white, brown or black and occurs at the level of the endothelium and Descemet's membrane primarily in the inter palpebral fissure area. In severe cases it can affect deep stroma.

C) INDOMETHACIN

It appears as a whorl like distribution resembling that seen in chloroquine keratopathy. These corneal changes diminish or disappear within 6 months of discontinuing indomethacin therapy. They are seen in patients taking indomethacin for 12 to 18 months with the daily doses ranging from 75 to 200mg.

The mechanisms of these opacities is unknown. Patients are usually asymptomatic.

D) GOLD SALTS

Corneal chrysiasis consists of the presence of numerous minute gold particles appearing as yellowish brown to violet or red particles distributed irregularly in the stroma. The deposition of the gold generally spares the peripheral 1 to 3 mm as well as superior ¼ to ½ of cornea and the deposits tend to localize to the posterior one third of the stroma. There is typically no involvement of epithelium, Descemet's membrane or epithelium.

Corneal chrysiasis is a common finding in patients receiving long term gold maintenance therapy for Rheumatoid arthritis . Deposits are found in 97% of patients receiving continuous gold therapy consisting of cumulative dosage of atleast 1000 mg.

Gold is deposited in the cornea and lens by circulation in the aqueous fluid in the anterior chamber. Deposits do not cause any visual disturbance.

E) AMIODARONE

i. Grade I :

A faint, horizontal line similar to a Hudson stahli line appear in the interpalpebral fissure at the junction of the middle and lower third of the cornea . It consists of golden brown micro deposits in the endothelium first anterior to Bowmans layer.

ii Grade II :

Transition to this stage occurs by 6 months , during which time deposits become aligned in a more linear pattern and extends towards the limbus .The Grade II pattern does not necessarily progress to Grade III .

iii. Grade III :

The deposits increase in number and density and lines extend superiorly to produce a whore like pattern into visual axis.

iv. Grade IV :

Irregular round clumps of deposits .

The keratopathy gradually resolves within 6 to 18 months after discontinuation of the drug therapy. Patients taking higher dosages (400 to 1400 mg daily) demonstrate more advanced keratopathy depending on the duration of the treatment

F) ATOVAQUONE

An anti- parasitic drug used to treat pneumonia in patients intolerant to trimethoprim - sulfamethoxazole, cause vorticilate keratopathy in susceptible patients .

Slit lamp examination shows bilateral whorl like patterns involving the inferior central corneal epithelium, with normal stroma and endothelium.

The vortex pattern is probably a result of growth and repair of corneal epithelium, with the flow of cells from peripheral to central cornea creating a whorl like configuration.

Keratopathy subsides once the drug is discontinued, and there is minimal risk of long term visual impairment.

G) ISOTRETINOIN

An analogue of vitamin A -Isotretinoin is used for the control of severe recalcitrant cystic acne and other keratinizing dermatoses.

It causes keratitis , corneal opacities and corneal vascularisation.

Epithelial keratitis has been reported in patients treated with an average dose of 2mg / kg for various dermatological diseases. Subepithelial corneal opacities may occur in both central and peripheral cornea and if the visual axis is involved, vision may be impaired.

Suppression of meibomian gland activity can also cause deficiency of normal lipid layer of the pre ocular tear film. This can lead to evaporation of aqueous layer and subsequent drying of the ocular surface, followed by epithelial and subepithelial defects.

DRUGS CAUSING LENTICULAR PIGMENTATION OR OPACITIES

1) CORTICOSTEROIDS

The use of systemic, topical ophthalmic, topical dermatologic and nasal aerosol or inhalation steroids cause posterior subcapsular cataract. Initially these opacities develop followed by anterior subcapsular opacity.

The relationship between weekly systemic dose, duration of administration, total dose and cataract formation is unclear. It is thought that patients on less than 10 mg prednisolone (or equivalent) or treated for less than 4 years, may be immune. Although it is believed that children may be more susceptible to the cataractogenic effects of systemic steroids. Individual (genetic) susceptibility may also be of relevance.

Patients who develop lens changes should have their dosages reduced to a minimum consistent with control of underlying disease, and if possible be considered for alternate drug therapy. Early opacities may regress if therapy is withdrawn, alternatively progression may occur despite withdrawal and warrant surgical intervention.

2) CHLORPROMAZINE

It causes deposition of innocuous, fine, stellate, yellowish, brown granules on the anterior lens capsule within the pupillary area.

Diffuse, granular deposits on the corneal endothelium and in the deep stroma may occur.

Both lenticular and corneal deposits are dose related and usually irreversible. In very high doses (>2400 mg/day), this drug may cause retinotoxicity.

3) BUSULPHAN

It is used in the treatment of chronic myeloid leukemia, may occasionally cause lens opacities.

4) AMIODARONE

It is a benzofurone derivative, used to treat a variety of cardiac abnormalities. The drug is highly effective in the treatment of both atrial and ventricular arrythmias and Wolf –Parkinson-White syndrome. Amiodarone can cause keratopathy and anterior subcapsular lens opacities early in the course of treatment.

Fine anterior subcapsular lens opacities occur in approximately 50% of patients taking amiodarone in moderate to high dosages (600 to 800mgdaily) after 6 to 18 months of treatment.

The deposits first appear as small, golden brown or white–yellow punctate opacities located just below the anterior lens capsule. They are packed loosely and cover an area greater than 2mm within the pupillary aperture. The

opacities are less darkly pigmented and are limited to the superficial anterior subcapsular area.

These lenticular opacities usually cause no visual symptoms, but moderate to severe keratopathy can lead to complaints of blurred vision, glare, haloes around lights or light sensitivity.

5) GOLD SALTS

Both parenteral and oral gold salts are used in the treatment of Rheumatoid Arthritis. After prolonged administration, gold can be deposited in various tissues of the body, a condition known as chrysiasis.

Lenticular chrysiasis appears as fine, dust like, yellowish glistening deposits in the anterior capsule or in the anterior suture lines. Oral Auronofin is deposited in the anterior subcapsular region.

There is no significant correlation between corneal chrysiasis and lenticular chrysiasis, and there is no evidence that gold therapy leads to cataract formation. Deposits of gold in the cornea or lens do not cause visual disturbances or other symptoms.

6) ALLOPURINOL

It is used in the treatment of hyperuricemia and chronic gout, increases the risk of cataract formation in elderly patients, if the cumulative dose exceeds 400 g or duration of administration exceeds 3 years.

HISTORY OF EVOLUTION OF ANTI -PSYCHOTIC DRUGS

During the past 50 yrs psychiatric treatment has witnessed major changes due to advent of drugs which can have specific salutary effect in mental illness.

The introduction of chlorpromazine in 1952 has transformed the lives of schizophrenics, more of them rehabilitated to productive life.

Reserpine was discovered soon after, though it has been powerful pharmacological agent to study mono aminergic systems in brain and periphery, its clinical use in psychiatry lasted only few years.

The tricyclic and monoamine oxidase antidepressants were introduced in 1957-58.

Meprobomate (1954) aroused the hope that anxiety could be tackled without producing marked sedation.

The introduction of Chlordiazepoxide in 1957 and other Benzodiazepines in 1960's namely Buspirone are subsequent additions.

The introduction of Lithium in 1949 and its effective use began from 1960's has unique place in psychiatry.

To the existing typical neuroleptics, atypical neuroleptics are getting added in recent years.

COMMONLY USED ANTI-PSYCHOTICS

PHENOTHIAZINES	USUAL DOSE/DAY	MAXIMUM DOSE/DAY
Chlorpromazine	100-400 mg/day	1 g
Thioridazine	100-400 mg/day	600 mg
Trifluperazine	5-15 mg/day	60 mg
Fluphenazine	2- 10 mg/day	60 mg
DIBENZODIAZEPINES		
Clozapine	300-400 mg/day	900 mg
BUTYROPHENONE		
Haloperidol	2-5 mg/day	60 mg
BENZISOXAZOLE		
Risperidone	2-6 mg/day	10 mg
THIENBENZODIAZEPINE		
Olanzapine	5-10 mg/day	10 mg

CHLORPROMAZINE

It is the antipsychotic drug belonging to phenothiazine group having aliphatic side chain.

MECHANISM OF ACTION

It has potent dopamine D2 receptor blocking action along with blockage of D1, D3 and D4 blockage action. Blockage of dopaminergic projections to the temporal and prefrontal areas constituting the limbic system and in mesocortical areas is probably responsible for antipsychotic action.

THERAPEUTIC USES

- Primarily in functional psychoses -schizophrenia
- Controls positive symptoms (hallucinations, delusions, disorganized thought, restlessness, insomnia, anxiety, aggression better than negative symptoms (apathy, loss of insight and volition, affect, flattening, poverty of speech, social withdrawal).
- They cause little improvement in judgement, orientation and memory. Patients with recent onset of illness respond better.
- Drug of choice in AGITATIVE, VIOLENT and COMBATIVE PATIENT.
- In mania, for rapid control.

- In organic brain syndrome, used on a short term basis one of the potent drugs preferred to avoid mental confusion, hypotension and precipitation of seizures.

II. Anxiety

It should not be used for simple anxiety. Those not responding to or having a psychotic basis for anxiety may be treated with these drugs.

III. As Antiemetics

Other uses

a) Pre-anaesthetic medication

b) To potentiate hypnotics, analgesics and anaesthetics.

c) Intractable hiccough.

d) Tetanus

e) Alcoholic hallucinosis, Huntington's disease and Gille's De La Tourette syndrome

PHARMACOKINETICS OF CHLORPROMAZINE

Oral absorption of chlorpromazine is unpredictable and bioavailability is low.

More consistent effects are produced after intramuscular or intravenous administration. It is highly bound to plasma as well as tissue proteins. Brain concentration is higher than plasma concentration. Volume of distribution is large (20 l/kg). It is metabolised in liver into a number of metabolites.

The acute effects of a single dose generally lasts 6-8 hours. The elimination half life is in the range of 30 hours. The drug cumulates on chronic administration and it is possible to give the total maintenance dose once a day. Some metabolites are potentially active.

The intensity of antipsychotic action is poorly correlated with plasma concentration. The metabolites are excreted in urine and bile for months after discontinuing the drug.

OCULAR SIDE EFFECTS OF CHLORPROMAZINE

1) LENTICULAR PIGMENTATION

5 GRADES

Grade I-> Earliest sign of lenticular toxicity is fine, dot like opacities on the anterior lens surface. At this stage, pigmentary deposits are small and tend to assume a disciform distribution within the pupillary area.

Grade II-> Dot like opacities that are denser and more opaque .

Grade III-> Large granules of pigment with an anterior subcapsular stellate pattern is easily recognized .

Colour of the opacities ranges from white to yellow to tan. The stellate pattern has a dense central area with radiating branches.

Grade IV-> A readily visible stellate pattern with three to nine star points . The lens changes at that stage can be recognized with pen light.

Grade V-> Central lightly pigmented, pearl like opaque mass surrounded by smaller clumps of pigment.

Corneal pigmentary changes are usually present in patients who are having grade III and above lenticular pigmentary changes.

The pigmentation is white, yellow –white, brown or black and occurs at the level of the endothelium and Descemet's membrane, primarily in the interpalpebral fissure and in severe cases, it affects the deep stroma.

The most prevalent ocular side effect associated with chlorpromazine therapy is anterior capsular and subcapsular pigmentation followed by corneal endothelial pigmentary changes. Both conditions, however, rarely reduce visual acuity and patients may occasionally report glare, haloes around lights or hazy vision.

Usually, the corneal and lenticular pigmentary changes progress to a point beyond which no further changes are observed. On reduction or discontinuation of drug therapy, the pigmentary changes are generally irreversible. This is because the deposits are located in avascular tissues .

The ocular changes associated with chlorpromazine are dose related. Lenticular pigmentation is rarely evident when the total dosage is less than 500g, and the prevalence of pigmentary changes increases with total dosages between 1000 and 2000 g, until 90% of patients demonstrate pigmentation when total dosage exceeds 2500g.

If daily dosage exceeds 800 mg, lenticular pigmentation as early as 14 to 20 months of therapy. Dosages consisting of 2000 mg daily have caused lenticular change in as little as 6 months of therapy.

Corneal pigmentation has been reported to occur within 6 months of therapy in 12 % of patients receiving 2000mg of chlorpromazine daily, but in only 1% of patients receiving 300mg of chlorpromazine daily .

An accepted hypothesis for pigmentary granules is that pigmentary changes are a result of drug interactions with UV light as it passes through the cornea and lens, causing exposed proteins to denature, opacify and accumulate in the anterior subcapsular region of the lens as well as stroma .

This explains why the keratopathy is localized to the interpalpebral fissure area . Other ocular side effects:-

1) Slate blue discolouration of conjuctiva and cornea

2) Decreases aqueous tear secretion

3) Mydriasis

4)Cycloplegia

5)Increase IOP

6)Pigmentary retinopathy

AIM OF THE STUDY

1) To evaluate the incidence of lenticular and corneal pigmentation with dose and duration of chlorpromazine therapy.

2 To evaluate the significance of lenticular and corneal pigmentation in causing visual defects .

MATERIALS AND METHODS

This clinical study was done to evaluate the incidence of corneal and lenticular pigmentation in patients with long term chlorpromazine therapy and its significance in causing visual defects.

The study design was a cross-sectional study conducted in Institute of Mental Health , Ayanavaram, Chennai.

The patients included in this study were in-patients residing in the Institute of Mental Health .

A total of 100 patients, 50 males and 50 female patients were studied.

The study was done during the period between June and September 2006.

The patients included in the study had the following problems :-

1. Chronic schizophrenia- various subtypes
2. Mild mental retardation with behavioural problems
3. Bipolar disorder-manic depressive psychosis
4. Substance induced psychosis(alcohol,cannabis)

All the selected patients are on multi drug regimen with tablet chlorpromazine as one of its component (Benzhexol, Risperidone, Olanzapine, Haloperidol, Trifluoperazine).

EXCLUSION CRITERIA

1. Those who are on chlorpromazine therapy for a period of less than 6 months duration

2. Those who are receiving drugs such as steroids, indomethacin, gold, atovaquone, isotretinoin, amiodarone, allopurinol and antimetabolites for co-morbid illness which may also lead to corneal and lenticular pigmentation or opacities

3. Those who are uncooperative

While selecting patients for study, particulars such as their name, age, sex and diagnosis was recorded.

Dosage of the drug, chlorpromazine was recorded in terms of following:-

1. Single morning dose/divided dose /maintenance dose/night dose
2. Duration of drug therapy
3. Increase /decrease in the dosage of drug therapy
4. Continuous /intermittent therapy
5. Complete stoppage of chlorpromazine/switch over to other antipsychotic drug.

History regarding highly restricted outdoor activity elicited from ward doctors, staff nurse, and hospital workers.

Patients evaluated for :-

1. Unaided visual acuity & improvement with pin hole using snellen's chart

2. Elicitation of ocular movements

3. Skin of lids – look for pigmentation or discolouration

4. Skin of palpebral fissure for depigmented patches

5. Bulbar conjunctiva

6. Cornea for opacities or pigmentation

7. Pupil -size, reaction to direct and consensual light reflex

8. Lens for pigment deposition or opacification in particular anterior subcapsular and capsular area

9. Intraocular pressure measurement digitally

10. Detailed fundus examination .

Examination from step 2 to 8 was done initially with torch light, followed by Slit lamp examination.

OBSERVATION AND RESULTS

MALE PATIENTS

TOTAL NUMBER - 50

AGE DISTRIBUTION

Table No. 1

AGE GROUP	NUMBER OF PATIENTS
21- 30 years	8(16%)
31-40 years	16(32%)
41-50 years	**21(42%)**
51-60 years	5(10%)
TOTAL	**50**

About 52 % of patients in this study are more than 40 years

DURATION OF THERAPY

Table No. 2

DURATION OF THERAPY	NUMBER OF PATIENTS
15 -20 years	5(10%)
10 -15 years	**15 (30%)**
5-10 years	12(24%)
2-5 years	10(20%)
6 months to 2 years	8(16%)
TOTAL	**50**

About 40% of patients in this study are in hospital for a period of more than 10 years.

LIST OF PATIENTS WHO HAD PIGMENTATION OR OPACITIES (CORNEAL AND LENTICULAR) IN GENERAL

Table No. 3

DOSAGE OF THERAPY	DURATION OF THERAPY	NUMBER OF PATIENTS
50-300mgs /day	15-20 years	4(23.5%)
100-200mgs/day	**10-15 years**	**9(53%)**
100-200mgs/day	5-10 years	2(11.6%)
100-300mgs /day	2-5 years	2(11.6%)
	TOTAL	**17**

Out of 50 patients, 17 patients (34%) had lenticular and corneal pigmentation for which dose and duration of therapy ranged from as early as 100-300mgs/day for a period of 2 to 5 years in 2 patients to as long as 50 -300 mgs /day for 15 to 20 years in 4 patients.

Of the pigmentation positive cases, 9 patients (53%) were on 100-200mg/day for a period of 10-15 years

LIST OF PATIENTS WHO DID NOT HAVE PIGMENTATION OR OPACTIES(CORNEAL AND LENTICULAR) IN GENERAL

Table No. 4

DOSAGE OF THERAPY	DURATION OF THERAPY	NUMBER OF PATIENTS
50-200 mgs/day	15-20 years	1(3%)
50-200 mgs/day	**10-15 years**	**6(18%)**
50-200mgs/day	**5-10 years**	**10(30%)**
50-150mgs/day	2-5 years	14(40%)
50 -150mgs/day	6 months -2 years	2(6%)
	TOTAL	**33**

Out of 50 patients, 33 patients (66%) did not have lenticular and or corneal pigmentation / opacities, for which dosage and duration of therapy ranged as early as 50 -150 mgs/day between 6 months -2 years in 2 patients to as late as 50-200 mgs /day for 15 -20 years in 1 patient.

Even 6 patients who had treatment for a period of 10-15 years with a dosage of 50-200mgs/day did not have pigmentation in cornea and lens.

RIGHT EYE VISUAL ACUITY IN PIGMENTATION POSITIVE CASES

Table No. 5

VISUAL ACUITY	NUMBER OF PATIENTS
6/6 to 6/6p with PH 6/6	3 (17%)
6/9 to 6/9p with PH 6/6	3 (17%)
6/12 to 6/12p with PH 6/6	**5(29.4%)**
6/18 to 6/18p with PH 6/6	4(23.5%)
6/24 to 6/24p with PH 6/6	0(0%)
6/36 to 6/36p with PH 6/6	0(0%)
1/60 to 6/60 NIP	2(11.7%)
TOTAL	**17**

About 29 % of patients had visual acuity of 6/12 to 6/12p improving with pin hole to 6/6. 10 out of 17 patients had visual acuity of 6/18 to 6/18p and above improving with pin hole to 6/6. 2 patients had visual acuity less than 6/60 NIP, of which one had alternate divergent squint and for the other it was grade IV lenticular pigmentation with corneal pigmentation associated with immature cataract.

LEFT EYE VISUAL ACUITY IN PIGMENTATION OR OPACITIES (CORNEAL AND LENTICULAR) POSITIVE CASES

Table No. 6

VISUAL ACUITY	NUMBER OF PATIENTS
6/6 to 6/6p with PH 6/6	3(17%)
6/9 to 6/9p with PH 6/6	**7(40%)**
6/12 to 6/12p with PH 6/6	4(23.5%)
6/18 with PH 6/6	1(5.8%)
6/24 to 6/24p with PH 6/6	0
6/36 NIP	1(5.8%)
1/60 NIP	1(5.8%)
TOTAL	**17**

About 40% of patients had visual acuity of 6/9 to 6/9p improving with pin hole to 6/6. 15 out of 17 patients had visual acuity of 6/18 to 6/18p improving with pin hole to 6/6.

One patient had visual acuity of 6/36 NIP because of associated alternate divergent squint and other had visual acuity of 1/60 NIP because of immature cataract.

RIGHT EYE VISUAL ACUITY IN PIGMENTATION/OPACITIES (CORNEAL AND LENTICULAR) NEGATIVE CASES

Table No. 7

VISUAL ACUITY	NUMBER OF PATIENTS
6/6 to 6/6p with PH 6/6	**9 (27.2%)**
6/9 to 6/9p with PH 6/6	5(15.15%)
6/12 to 6/12p with PH 6/6	2(6%)
6/18 to 6/18p with PH 6/6	7(21.2%)
6/24 to 6/24p with PH 6/12 to 6/9	5 (15.1%)
6/36 to 6/36p NIP	2(6%)
6/60 to 1/60 NIP	3(9%)
TOTAL	**33**

About 27% of patients had visual acuity of 6/6 to 6/6p improving with pin hole to 6/6.23 out 33 patients (69%) had visual acuity of 6/18 to 6/18p improving with pin hole to 6/6.

5 patients (15 %) had visual acuity of 6/36 to 1/60 NIP because of associated immature cataract.

LEFT EYE VISUAL ACUITY IN PIGMENTATION OR OPACITIES (CORNEAL AND LENTICULAR) NEGATIVE CASES IN GENERAL

Table No : 8

VISUAL ACUITY	NUMBER OF PATIENTS
6/6 to 6/6p with PH 6/6	8 (24.2%)
6/9 to 6/9p with PH 6/6	4 (12.1%)
6/12 to 6/12p with PH 6/6	**10 (30.3%)**
6/18 to 6/18p with PH 6/6	3 (9%)
6/24 to 6/24p with PH 6/12	2 (6%)
6/36 to 6/36p NIP	2 (6%)
6/60 to 1/60 NIP	4 (12.1%)
TOTAL	**33 patients**

About 30% of patients had visual acuity of 6/12 to 6/12p improving with pin hole to 6/6. 25 out of 33 (80%) had visual acuity of 6/18 t0 6/18p and above improving with pin hole to 6/6. 4 patients had reduced visual acuity because of associated immature cataract.

LATERALITY OF LENTICULAR PIGMENTATION

Table No : 9

LATERALITY	NUMBER OF PATIENTS
Bilateral	13 (76.4%)
Unilateral	4 (23.5%)
TOTAL	**17**

In about 76% of patients lenticular pigmentation was bilateral. The involvement was unilateral in rest of the patients, of which one had pseudophakia, one had adherent leucoma.

RIGHT EYE – NO. OF PATIENTS IN VARYING GRADES OF LENTICULAR PIGMENTATION AMONG POSITIVE CASES

Table No : 10

GRADES	NUMBER OF PATIENTS
V	**9 (56.2%)**
IV	0 (0 %)
III	7 (43.7%)
II	0 (0%)
I	0 (0%)
TOTAL	**16**

About 56% of patients had Grade V lenticular pigmentation among positive cases.

LEFT EYE – NO OF PATIENTS IN VARYING GRADES OF LENTICULAR PIGMENTATION AMONG POSITIVE CASES

Table No : 11

GRADES	NO OF PATIENTS
V	**8 (50%)**
IV	4 (25%)
III	3 (18.7%)
II	1 (6.3%)
I	0 (0%)
TOTAL	**16**

About 50% of patients had Grade V lenticular pigmentation among positive cases.

RIGHT EYE

GRADE -V - 9 PATIENTS

Table No - 12

VISUAL ACUITY	NUMBER OF PATIENTS
6/6 to 6/6p with PH 6/6	2 (22.2%)
6/9 to 6/9p with PH 6/6	0 (0%)
6/12 to 6/12p with PH 6/6	2 (22.2%)
6/18 to 6/18p with PH 6/6	2 (22.2%)
6/24 to 6/24p with PH 6/12	2 (22.2%)
6/36 to 6/36p NIP	1 (11.1%)
6/60 to 1/60 NIP	0 (0%)
TOTAL	**9**

About two third of the patients in Grade V lenticular pigmentation had visual acuity of 6/18 to 6/18p and above improving with pin hole to 6/6. Rest of the patients had low visual acuity that was attributed to immature cataract and age related lens changes.

RIGHT EYE

GRADE - III - 7 PATIENTS

Table No - 13

VISUAL ACUITY	NUMBER OF PATIENTS
6/6 to 6/6p with PH 6/6	**2 (28.2%)**
6/9 to 6/9p with PH 6/6	1 (14.1%)
6/12 to 6/12p with PH 6/6	**2(28.2%)**
6/6 to 6/18p with PH 6/6	1 (14.1%)
6/24 to 6/24p with PH6/12	1 (14.1%)
6/36 to 6/36p NIP	0 (0%)
6/60 to 1/60 NIP	0 (0%)
TOTAL	**7**

About 80% of the patients in Grade III lenticular pigmentation had visual acuity of 6/18 to 6/18p and above improving with pin hole to 6/6.

LEFT EYE

GRADE – V - 8 PATIENTS

Table No -14

VISUAL ACUITY	NUMBER OF PATIENTS
6/6 to 6/6p with PH 6/6	2 (25%)
6/9 to 6/9p with PH 6/6	**4 (50%)**
6/12 to 6/12p with PH 6/6	1 (12.5%)
6/18 to 6/18p with PH 6/6	1 (12.5%)
6/24 to 6/24p with PH 6/12	0 (0%)
6/36 to 6/36p NIP	0 (0%)
6/60 to 1/60 NIP	0(0%)
TOTAL	**8**

Almost all patients had visual acuity of 6/18 to 6/18p and above improving with pin hole to 6/6.

GRADE - IV - 4 PATIENTS

Table No - 15

VISUAL ACUITY	NUMBER OF PATIENTS
6/6 to 6/6p with PH 6/6	0 (0%)
6/9 to 6/9p with PH 6/6	1 (25%)
6/12 to 6/12p with PH 6/6	1 (25%)
6/18 to 6/18p with PH 6/6	0 (0%)
6/24 to 6/24p with PH 6/12	0 (0%)
6/36 to 6/36p NIP	1 (25%)
6/60 to 1/60 NIP	1 (25%)
TOTAL	**4**

About 50% of the patients had visual acuity of 6/12 to 6/12p and above improving with pin hole. In rest of the patients visual acuity was reduced due to associated alternate divergent squint and immature cataract**.**

GRADE – III - 3 PATIENTS

Table No - 16

VISUAL ACUITY	NUMBER OF PATIENTS
6/6p with PH 6/6	1 (33%)
6/12 to 6/12p with PH 6/6	**2 (66%)**
TOTAL	**3**

Almost all the patients in Grade 3 lenticular pigmentation had visual acuity of 6/12 to 6/12p and above improving with pin hole to 6/6.

GRADE - 2 - 1 PATIENT 6/9p with pin hole 6/6

LATERALITY OF CORNEAL PIGMENTATION IN PATIENTS WITH LENTICULAR PIGMENTATION

Table No - 17

LATERALITY	NUMBER OF PATIENTS
Bilateral	11(62.3%)
Unilateral	3(17.6%)
Absent	3(17.6%)
TOTAL	**17**

Almost all the patients with grade III to V lenticular pigmentation had corneal pigmentation.

SIGNIFICANCE OF CORNEAL PIGMENTATION WITH ASSOCIATED VISUAL DEFECTS

RIGHT EYE – CORNEAL PIGMENTATION – 14 PATIENTS

Table No - 18

VISUAL ACUITY	NUMBER OF PATIENTS
6/6p to 6/6 with PH 6/6	2(14.2%)
6/9p to 6/9 with PH 6/6	3(21.4%)
6/12p to 6/12 with PH 6/6	**4(28.5%)**
6/18p to 6/18 with PH 6/6	3(21.4%)
6/24p to 6/24	0
6/36p to 6/36	0
6/60 to 1/60	1(7%)
TOTAL	**14**

Almost 90% of patients had visual acuity of 6/18p to 6/18 that improved with pin hole to 6/6. One patient had decreased visual acuity because of associated alternate divergent squint.

LEFT EYE – SIGNIFICANCE OF CORNEAL PIGMENTATION WITH ASSOCIATED VISUAL DEFECTS

LEFT EYE - CORNEAL PIGMENTATION - 16 PATIENTS

Table No - 19

VISUAL ACUITY	NUMBER OF PATIENTS
6/6 to 6/6p with PH 6/6	4 (25%)
6/9 to 6/9p with PH 6/6	2 (12.5%)
6/12 to 6/12p with PH 6/6	2 (12.5%)
6/18 to 6/18p with PH 6/6	6 (37.5%)
6/24 to 6/24p with PH 6/12	2 (12.5%)
TOTAL	**16**

More than 85% of corneal pigmentation positive patients had visual acuity of 6/18 to 6/18 p and above improved with pin hole to 6/6.

FEMALE PATIENTS

TOTAL NUMBER OF PATIENTS :- 50

DURATION OF STAY

Table No. 20

DURATION OF STAY	NUMBER OF PATIENTS
>25 years	4(8%)
20 -25 years	5(10%)
15- 20 years	**11(22%)**
10 -15 years	7(14%)
5-10 years	7(14%)
2-5 years	9(18%)
6 months -2 years	7(14%)
TOTAL	**50**

About 40% of patients in this study are in the hospital for a period of more than 15 years.

AGE DISTRIBUTION

Table No. 21

AGE GROUP	NUMBER OF PATIENTS
20-30 years	10(20%)
31-40 years	9(18%)
41-50 years	**17(34%)**
51-60 years	5(10%)
61-70 years	9(18%)
TOTAL	**50**

About 62 % of patients are more than 40 years.

LIST OF PATIENTS WHO HAD PIGMENTATION OR OPACITIES (CORNEAL AND LENTICULAR) IN GENERAL

Table No. 22

DOSAGE OF THERAPY	DURATION OF THERAPY	NUMBER OF PATIENTS
50-200mgs /day	>25 years	3(17.6%)
50-300mgs/day	20-25 years	4(23.5%)
50-200mgs/day	**15-20 years**	**8(47%)**
100-300mgs/day	10-15 years	1(5.8%)
100-200mgs/day	5-10 years	1(5.8%)
	TOTAL	**17**

About 47% of patients who had lenticular and corneal pigmentation were on tablet chlorpromazine 50- 200 mgs /day for a period of 15-20 years Pigmentation was seen as early as 100-200 mgs/day for 5 to 10 years in 1 patient to as late as 50-200 mgs /day for more than 25 years in 3 patients.

LIST OF PATIENTS WHO DID NOT HAVE PIGMENTATION OR OPACITIES (CORNEAL AND LENTICULAR) IN GENERAL

Table No. 23

DOSAGE OF THERAPY	DURATION OF THERAPY	NUMBER OF PATIENTS
50mgs/day	>25 years	1(3%)
50-100mgs/day	20-25 years	1(3%)
50-100mgs/day	15-20years	3(9%)
50-100mgs/day	10-15years	6(18%)
50-200mgs/day	5-10years	6(18%)
50-200mgs/day	**2-5years**	**9(36%)**
50-100mgs/day	6months -2years	7(21%)
	TOTAL	**33**

Five out of thirty three patients who were on 50 - 100mgs/day for more than 15 years did not have pigmentation .

RIGHT EYE VISUAL ACUITY IN PIGMENTATION OR OPACITY (CORNEAL AND LENTICULAR)POSITIVE CASES

Table No. 24

VISUAL ACUITY	NUMBER OF PATIENTS
6/6 to 6/6p with PH 6/6	**4(23.5%)**
6/9 to 6/9p with PH 6/6	**1(5.8%)**
6/12 to 6/12p with PH 6/6	**4(23.5%)**
6/18 to 6/18p with PH 6/6	**4(23.5%)**
6/24 to 6/24p with PH 6/12	3(17.6%)
6/36NIP	1(5.8%)
TOTAL	**17**

About 70% had visual acuity of 6/18 to 6/18p improving with pin hole to 6/6. The rest had visual acuity less than 6/24 because of associated lens changes.

LEFT EYE VISUAL ACUITY IN PIGMENTATION OR OPACITY (CORNEAL AND LENTICULAR) POSITIVE CASES

Table No.25

VISUAL ACUITY	NUMBER OF PATIENTS
6/6 to 6/6p with PH 6/6	**4(23.5%)**
6/9 to 6/9p with PH 6/6	**2(11.8%)**
6/12 to 6/12p with PH 6/6	**2(11.8%)**
6/18 to 6/18p with PH 6/6	**7(41.1%)**
6/24 to 6/24p with PH 6/12	2(11.8%)
TOTAL	**17**

About 80% had visual acuity of 6/18 to 6/18p improving with pin hole to 6/6. The rest had visual acuity of 6/24 because of associated lens changes.

RIGHT EYE VISUAL ACUITY IN PIGMENTATION OR OPACITY (CORNEAL AND LENTICULAR) NEGATIVE CASES

Table No.26

VISUAL ACUITY	NUMBER OF PATIENTS
6/6 to 6/6p with PH 6/6	**6(18.1%)**
6/9 to 6/9p with PH 6/6	**7(21.2%)**
6/12 to 6/12p with PH 6/6	**8(24.2%)**
6/18 to 6/18p with PH 6/6	**4(12.1%)**
6/24 to 6/24p with PH 6/12	4(12.1%)
6/36 to 6/36p NIP	2(6%)
6/60 to 1/60 NIP	2(6%)
TOTAL	**33**

About 77% had visual acuity of 6/18 to 6/18p improving with pin hole to 6/6. Rest had decreased visual acuity because of associated lens changes.

LEFT EYE VISUAL ACUITY IN PIGMENTATION OR OPACITY (CORNEAL AND LENTICULAR) NEGATIVE CASES

Table No.27

VISUAL ACUITY	NUMBER OF PATIENTS
6/6 to 6/6p with PH 6/6	**7(21.2%)**
6/9 to 6/9p with PH 6/6	**9(27.2%)**
6/12 to 6/12p with PH 6/6	**6(18.1%)**
6/18 to 6/18p with PH 6/6	3(9%)
6/24 to 6/24p with PH 6/12	5(15%)
6/60 to 1/60 NIP	3(9%)
TOTAL	**33**

About 76% had visual acuity of 6/18 to 6/18p that was improving with pin hole to 6/6. Rest had visual acuity of 6/24 or below because of associated lens changes and immature cataract.

LATERALITY OF LENTICULAR PIGMENTATION

Table No. 28

LATERALITY	NUMBER OF PATIENTS
Bilateral	16 (94%)
Unilateral	1(6%)
TOTAL	**17**

About 94% of patients had bilateral lenticular pigmentation.

RIGHT EYE - NO. OF PATIENTS IN VARYING GRADES OF LENTICULAR PIGMENTATION AMONG POSITIVE CASES

Table No. 29

GRADES	NUMBER OF PATIENTS
V	9 (52.3%)
III	7 (47.7%)
TOTAL	**16**

About **52**% of patients had Grade V lenticular pigmentation and the rest Grade III.

LEFT EYE - NO. OF PATIENTS IN VARYING GRADES OF LENTICULAR PIGMENTATION AMONG POSITIVE CASES

Table No. 30

GRADES	NO. OF PATIENTS
V	11(64.7%)
IV	2 (11.7%)
III	3 (17.6%)
II	1 (5.8%)
TOTAL	**17**

About 65% patients had Grade V lenticular pigmentation

RIGHT EYE

GRADE V - 9 PATIENTS

Table No. 31

VISUAL ACUITY	NUMBER OF PATIENTS
6/6 TO 6/6p with PH 6/6	2 (22.2%)
6/12 to 6/12p with PH 6/6	2 (22.2%)
6/18 to 6/18p with PH 6/6	2 (22.2%)
6/24 to 6/24p with PH 6/12	2 (22.2%)
6/36 NIP	1 (11.1%)
TOTAL	**9**

About 66% of patients with Grade V lenticular pigmentation had visual acuity of 6/18 to 6/18p improving with pin hole to 6/6 .

GRADE III - 7 PATIENTS

Table No.32

VISUAL ACUITY	NUMBER OF PATIENTS
6/6 to 6/6p with PH 6/6	2 (28.5%)
6/9 with PH 6/6	1 (14.2%)
6/12 to 6/12p with PH 6/6	2 (28.5%)
6/18 with PH 6/6	1 (14.2%)
6/24 with PH 6/12	1 (14.2%)
TOTAL	**7**

About 85% of patients with Grade III lenticular pigmentation had visual acuity of 6/18 to 6/18p improving with pin hole to 6/6.

LEFT EYE

GRADE V - 11 PATIENTS

Table No - 33

VISUAL ACUITY	NUMBER OF PATIENTS
6/6 to 6/6p with PH 6/6	3 (27.2%)
6/12 to 6/12p with PH 6/6	2 (18.1%)
6/18 to 6/18p with PH 6/6	5 (45.5%)
6/24 with PH 6/12	1 (9%)
TOTAL	**11**

About 90% of patients with Grade V lenticular pigmentation had visual acuity of 6/18 to 6/18p improving with pin hole to 6/6.

GRADE III - 3 PATIENTS

Table No- 34

VISUAL ACUITY	NUMBER OF PATIENTS
6/6p with PH 6/6	1 (33%)
6/9 to 6/9p with PH 6/6	2 (66%)
TOTAL	**3**

GRADE IV - 2 PATIENTS

Table No- 35

VISUAL ACUITY	NUMBER OF PATIENTS
6/18 with PH 6/6	1 (50%)
6/24 with PH 6/12	1 (50%)
TOTAL	**2**

GRADE II -1 PATIENT : 6/18p with pin hole 6/6 .

LATERALITY OF CORNEAL PIGMENTATION IN PATIENTS WITH LENTICULAR PIGMENTATION

Table No - 36

LATERALITY	NUMBER OF PATIENTS
Bilateral	**14 (82%)**
Unilateral	2 (11.7%)
Absent	1 (5.9%)
TOTAL	**17**

RIGHT EYE - SIGNIFICANCE OF CORNEAL PIGMENTATION WITH ASSOCIATED VISUAL DEFECT

RIGHT EYE CORNEAL PIGMENTATION - 14 PATIENTS

Table No - 37

VISUAL ACUITY	NUMBER OF PATIENTS
6/6 to 6/6p with PH 6/6	4 (28.5%)
6/9 with PH 6/6	1 (7.1%)
6/12 to 6/12p with PH 6/6	4 (28.5%)
6/18 to 6/18p with PH to 6/6	4(28.5%)
6/36 with PH 6/12	1 (7.1%)
TOTAL	**14**

About 92% of patients who had corneal pigmentation, had visual acuity of 6/18 to 6/18p improving with pin hole to 6/6.

LEFT EYE – SIGNIFICANCE OF CORNEAL PIGMENTATION WITH ASSOCIATED VISUAL DEFECT

LEFT EYE - CORNEAL PIGMENTATION 16 PATIENTS

Table No - 38

VISUAL ACUITY	NUMBER OF PATIENTS
6/6 to 6/6p with PH 6/6	4 (25%)
6/9 to 6/9p with PH 6/6	2 (12.5%)
6/12 to 6/12p with PH 6/6	2 (12.5%)
6/18 to 6/18p with PH 6/6	6 (37.5%)
6/24 to 6/24p with PH 6/12	2 (12.5%)
TOTAL	**16**

More than 80% of corneal pigmentation positive patients had visual acuity of 6/18 to 6/18p improving with pin hole to 6/6.

DISCUSSION

The ocular changes associated with chlorpromazine therapy are dose related.

The most prevalent ocular side effects associated with chlorpromazine therapy are anterior capsular and subcapsular pigmentation followed by corneal endothelial pigmentary changes. Both conditions do not affect visual acuity significantly. (Ref- Clinical Ocular pharmacology-fourth edition-Jimmy D.Barlett Siret D.jaanus)

This study has been directed towards detecting the incidence of corneal and lenticular pigmentation or opacities in 100 mentally ill patients on T. Chlorpromazine for more than 6 months period.

MALE PATIENTS

The majority of male patients are in the age group 41- 50 years and they have been hospitalized as inpatients for more than 10 years .

Up to 34% of patients had corneal and lenticular pigmentation or opacities. Among the patients who had pigmentation or opacities, 53% are on T. Chlorpromazine 100-200mg/day for more than 10 years.

The right eye visual acuity in pigmentation positive cases is 6/18 to 6/18p and above, improved with pin hole to 6/6 in 58% of patients.

The left eye visual acuity in pigmentation positive cases is 6/18 to 6/18p and above, improved with pin hole to 6/6 in 80% of patients.

The right eye visual acuity in pigmentation negative cases is 6/18 to 6/18p and above, improved with pin hole to 6/6 in 69% of patients.

The left eye visual acuity in pigmentation negative cases is 6/18 to 6/18p and above, improved with pin hole to 6/6 in 80 % of patients.

About 66% of patients did not have pigmentary changes. Even 21% of patients who are on 50-200mg /day for more than 10 years did not develop pigmentary changes for which highly restricted out door activity is supposed to be the associated factor.

In 76% of the patients lenticular pigmentary changes are bilateral.

About 56% of patients with Grade V lenticular pigmentation had visual acuity of 6/18 to 6/18p and above, improved with pin hole to 6/6 in right eye and almost all patients with Grade V lenticular pigmentation had visual acuity of 6/18 to 6/18p and above, improved with pin hole to 6/6 in left eye.

Almost 90% of patients with corneal pigmentary changes had visual acuity of 6/18 to 6/18p and above, improved with pin hole to 6/6 in both eyes.

FEMALE PATIENTS

The majority of female patients are in the age group 41-50 yrs and about 22% of them were residing as inpatients for more than 15 years.

The Right eye visual acuity in pigmentation positive cases is 6/18 to 6/18p and above, improved with pin hole to 6/6 in about 70% of patients.

The left eye visual acuity in pigmentation positive cases is 6/18 to 6/18p and above, improved with pin hole to 6/6 in about 80% of patients.

The right eye visual acuity in pigmentation negative cases is 6/18 to 6/18p and above, improved with pin hole to 6/6 in about 77 % of patients.

The left eye visual acuity in pigmentation negative cases is 6/18 to 6/18p and above, improved with pin hole to 6/6 in about 76% of patients.

About 66% of patients in the study did not have pigmentary changes. Even 33% of patients on T. Chlorpromazine 50-100mg/day for more than 10 years did not have pigmentary changes for which highly restricted out door activity is supposed to be the associated factor.

About 94% of patients had bilateral lenticular pigmentary changes About 66% of patients in grade V lenticular pigmentation had visual acuity of 6/18 to 6/18p and above, improved with pin hole to 6/6 in right eye and about 90% of patients in grade V lenticular pigmentation had visual acuity of 6/18 to 6/18p and above, improved with pin hole to 6/6 in left eye.

Almost 90% of patients with corneal pigmentary changes had visual acuity of 6/18 to 6/18p and above, improved with pin hole to 6/6.

Some patients in the study are having age related lens changes, traumatic cataract, adherent leucoma and alternate divergent squint, which might be the reasons for the significant visual loss.

In general, the lenticular and corneal pigmentary changes did not affect visual acuity significantly.

SUMMARY

- This clinical study was done at Institute of mental health, Ayanavaram.
- A total of 100 mentally ill patients were evaluated, 50 male and 50 female patients.
- Relevant data collected from each patients and they were subjected to a detailed ophthalmic evaluation.
- 32% of males were in age group 31– 40 years and 34% of females were in age group 41-50 years.
- 30% of males were on Chlorpromazine therapy for a period of 10-15 years and 22% of females for 15-20 years.
- Male patients who were on T.Chlorpromazine 100-200mg/day for more than 10 years had significant lenticular and corneal pigmentary changes.
- Female patients who were on T.Chlorpromazine 50-200mg/day for more than 15 years had significant lenticular and corneal pigmentary changes.
- The difference in pigmentary changes with dose and duration of therapy between males and females is probably due to restricted out door activity in the later. An accepted hypothesis for pigmentary granules is that pigmentary changes are a result of drug interactions with UV light as it passes through the cornea and lens, causing exposed proteins to

denature, opacify and accumulate in the anterior subcapsular region of the lens as well as stroma.

- Most patients had grade III to grade V lenticular pigmentary changes.
- Corneal pigmentary changes are seen in more than 95 % of patients with grade III to grade V lenticular pigmentary changes.
- The lenticular and corneal pigmentary changes as such did not affect visual acuity significantly
- The lenticular pigmentation was seen in anterior capsular and subcapsular region followed by corneal endothelial pigmentary changes, confined to interpalpebral fissure area.

CONCLUSION

- Lenticular and corneal pigmentary changes are the most significant ocular side effects of long term therapy with Chlorpromazine in mentally ill patients.

- Detailed ophthalmological evaluation by an ophthalmologist should be made mandatory before starting a patient on Chlorpromazine.

- Patients on long term Chlorpromazine should be subjected for detailed ophthalmic evaluation periodically (Every 2 years in first 10 years and annually thereafter. If the dosage is more than 200mg/day, evaluation should be done in annual basis).

- The present scenario in rehabilitating the mentally ill patients, other specialist like Ophthalmologist should also play a major role with Psychiatrist to make the patients in leading a dignified independent life.

TEAM APPROACH YIELDS BETTER RESULTS

EVERY WHERE

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PROFORMA

1. NAME

2. AGE

3. SEX

4. OCCUPATION

5. ADDRESS

6. PSYCHIATRIC DIAGNOSIS

   a. SCHIZOPHRENIA -VARIOUS SUB TYPES
   b. MILD MENTAL RETARDATION WITH BEHAVIOURAL PROBLEM
   c. BIPOLAR DISORDERS
   d. SUBSTANCE INDUCED PSYCHOSIS (ALCOHOL/ CANNABIS)

7.CHLORPROMAZINE- a. DOSAGE OF THERAPY
b. DURATION OF THERAPY
c. MULTI DRUG REGIMEN
1. Name of drug / drugs
2. Dosage and duration of drugs

8. PAST HISTORY

9. FAMILY HISTORY

GENERAL EXAMINATION

1. Built and Nourishment

2.Anaemia, Jaundice, Cyanosis, Clubbing, Lymphadenopathy

CARDIO VASCULAR SYSTEM

RESPIRATORY SYSTEM

CENTRAL NERVOUS SYSTEM

ABDOMEN

RIGHT EYE		LEFT EYE
	VISUAL ACUITY (UNAIDED AND WITH PH)	
	OCULAR MOVEMENTS	
	LIDS	
	CONJUNCTIVA	
	CORNEA	
	ANTERIOR CHAMBER	
	IRIS	
	PUPIL	
	LENS	
	TENSION	
	SLIT LAMP EXAMINATION	
	FUNDUS	

OPERATIONS PERFORMED

S. NO	DATE	NAME	AGE / SEX	DIAGNOSIS	PROCEDURE
1.	10/07/04	KAVITHA	15/F	LE-Upper lid chalazion	LE-I&C done
2.	07/08/04	KUPPU	28/F	RE-Nasal pterygium	RE-Pterygium excision done
3.	23/08/04	ANGAMMAL	70/F	RE-Mature cataract	RE-ECCE with PCIOL done
4.	16/09/04	MANI	68/M	LE-Mature cataract	LE-ECCE with PCIOL done
5.	28/10/04	CHINNAMMAL	66/F	RE-Mature cataract	RE-ECCE with PCIOL done
6.	18/09/04	PRAKASH	35/M	LE-Upper lid chalazion	LE-I&C done
7.	02/03/05	KANAGAVALLI	55/F	RE-Mature cataract	RE-ECCE with PCIOL
8.	25/04/05	INDRANI	60/F	RE-Chronic Dacryocystitis	RE-DCT done
9.	05/05/05	PERUMAL	80/F	LE-Mature cataract	LE-ECCE with PCIOL done
10.	28/06/05	DEVAKI	60/F	LE-Immature cataract	LE-ECCE with PCIOL done
11.	13/08/05	KILIAMMAL	60/F	LE-Painful blind eye due ti\o mixed corneal ulcer	LE-Evisceration done
12.	05/09/05	RAMASAMY	62/M	LE-Chronic Dacryocystitis	LE-DCT done
13.	19/10/05	DHANAPAL	54/M	RE-Nuclear cataract	RE-ECCE with PCIOL done
14.	27/12/05	VASU	23/M	RE-Nasal & Temporal pterygium	RE-Pterygium excision done
15.	06/01/06	KUMAR	50/M	RE-Mature cataract	RE-ECCE with PCIOL done
16.	24/02/06	MUTHAMMAL	50/F	RE-Immature	RE-ECCE with

S. NO	DATE	NAME	AGE / SEX	DIAGNOSIS	PROCEDURE
				cataract	PCIOL done
17.	03/05/06	SHEKDAVUDMA	75/F	LE-Immature cataract	LE-SICS with PCIOL done
18.	02/06/06	KASTHURI	67/F	LE-Immature cataract	LE-SICS with PCIOL done
19.	03/07/06	AZHAGUTHAI	50/F	LE-Immature cataract	LE-SICS with PCIOL done
20.	28/07/06	RAMAYEE	54/F	LE-Nuclear cataract	LE-ECCE with PCIOL done
21.	04/08/06	ANDALAMMAL	60/F	RE-Immature cataract	RE-SICS with PCIOL done
22.	04/08/06	RANGANATHAN	63/M	LE-Immature cataract	LE-SICS with PCIOL done
23.	28/08/06	RAJU	70/M	LE-Immature cataract	LE-SICS with PCIOL done
24.	01/09/06	KODEESWARI	64/F	LE-Immature cataract	LE-SICS with PCIOL done
25.	08/09/06	NARAYANAN	75/M	RE-Immature cataract	RE-SICS with PCIOL done

KEY TO MASTER CHART

m - male

f - female

CP - Corneal pigmentation

P - Present

A - Absent

LP - Lenticular pigmentation

Grades

I - Fine,dot like opacities on anterior lens capsule

II - Dot like opacities denser and more opaque

III - Large granules of pigment with an anterior subcapsular stellate pattern

IV - Readily visible stellate pattern with three to nine star points

V - Central lightly pigmented, pearl like opaque mass surrounded by smaller granules of pigment

V/A- Visual acuity

p - Partial

PH - Pinhole

RE - Right eye

LE - Left eye

E - Emmetropia

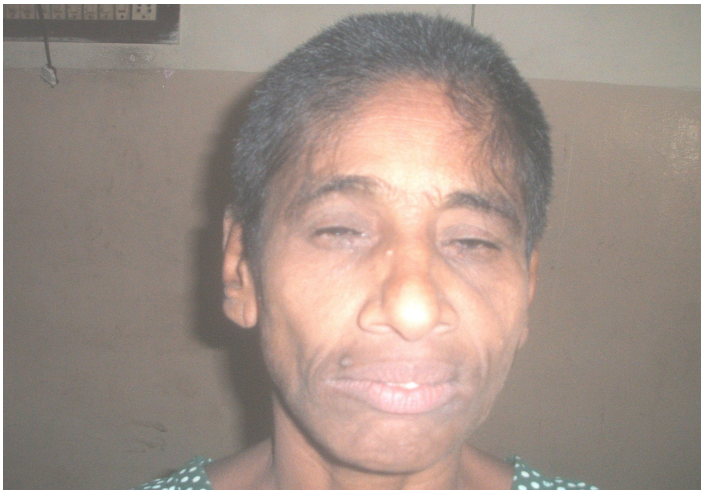
LC - Lens changes

IMC - Immature Cataract

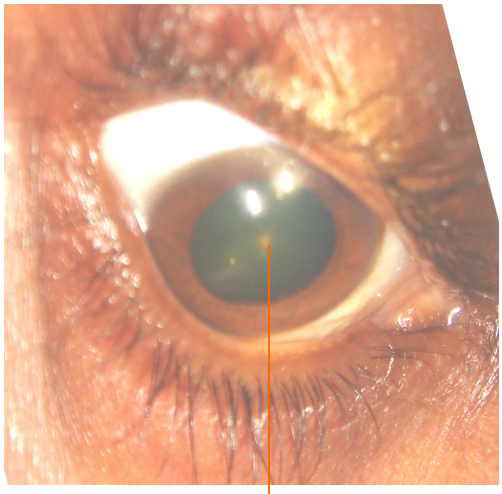
TR.CA - Traumatic cataract

PATIENTS WHO HAD PIGMENTATION

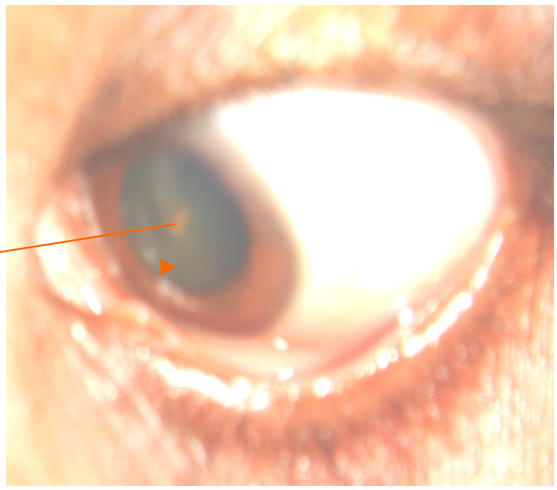
MALE AND FEMALE (FEW PICTURES)

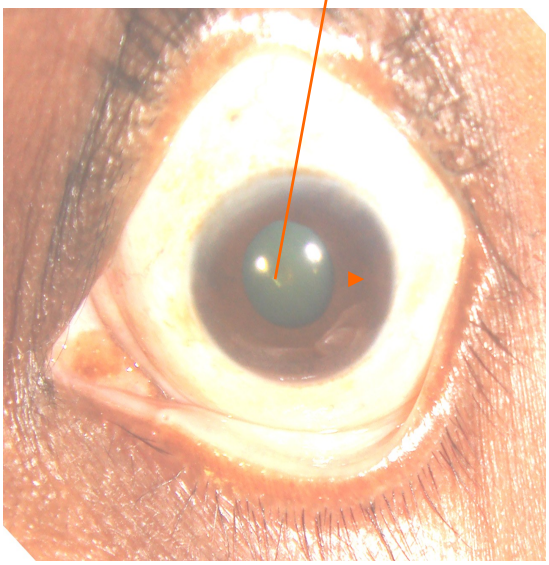


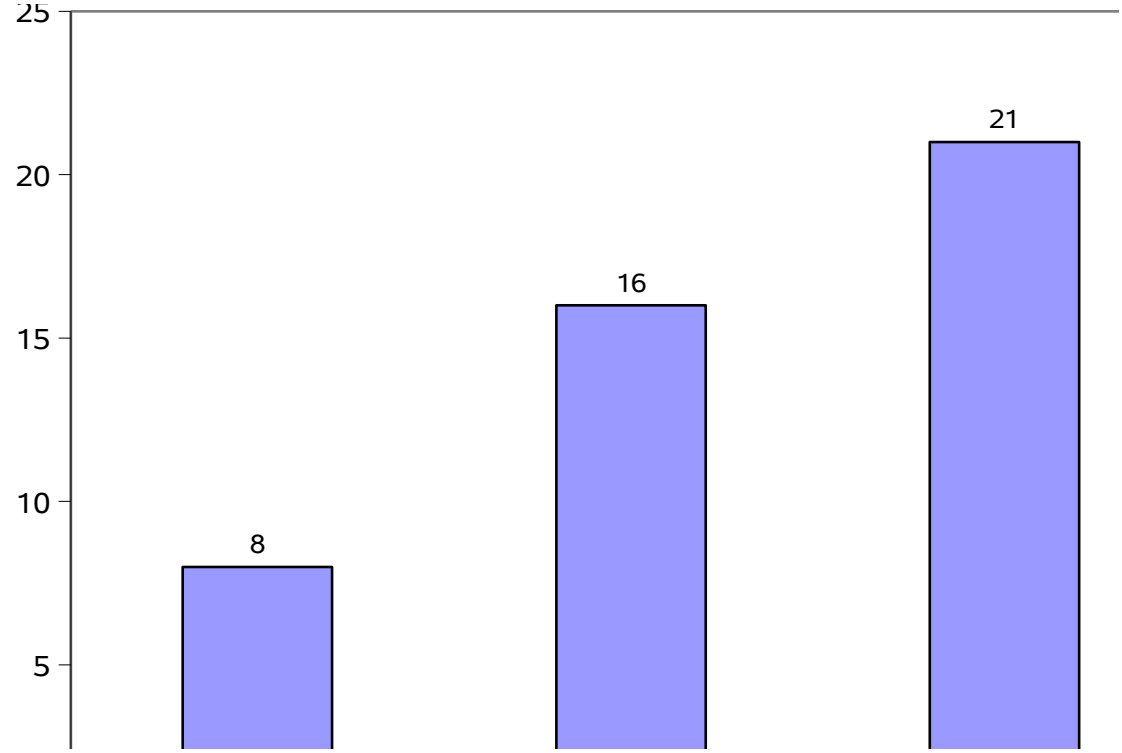
LENTICULAR PIGMENTATION



PIGMENTATION






25
20
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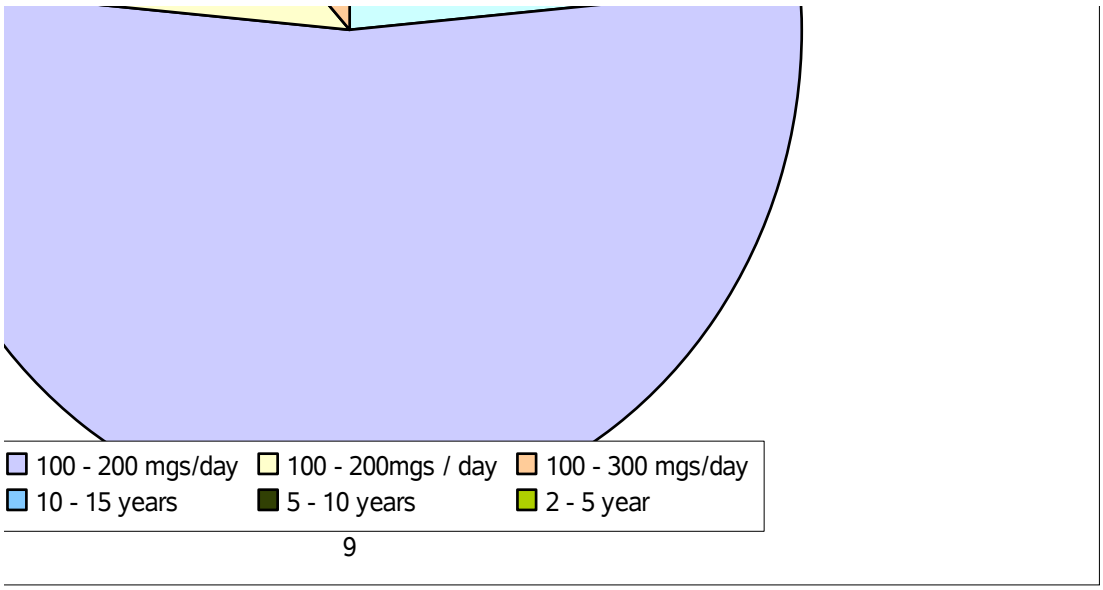
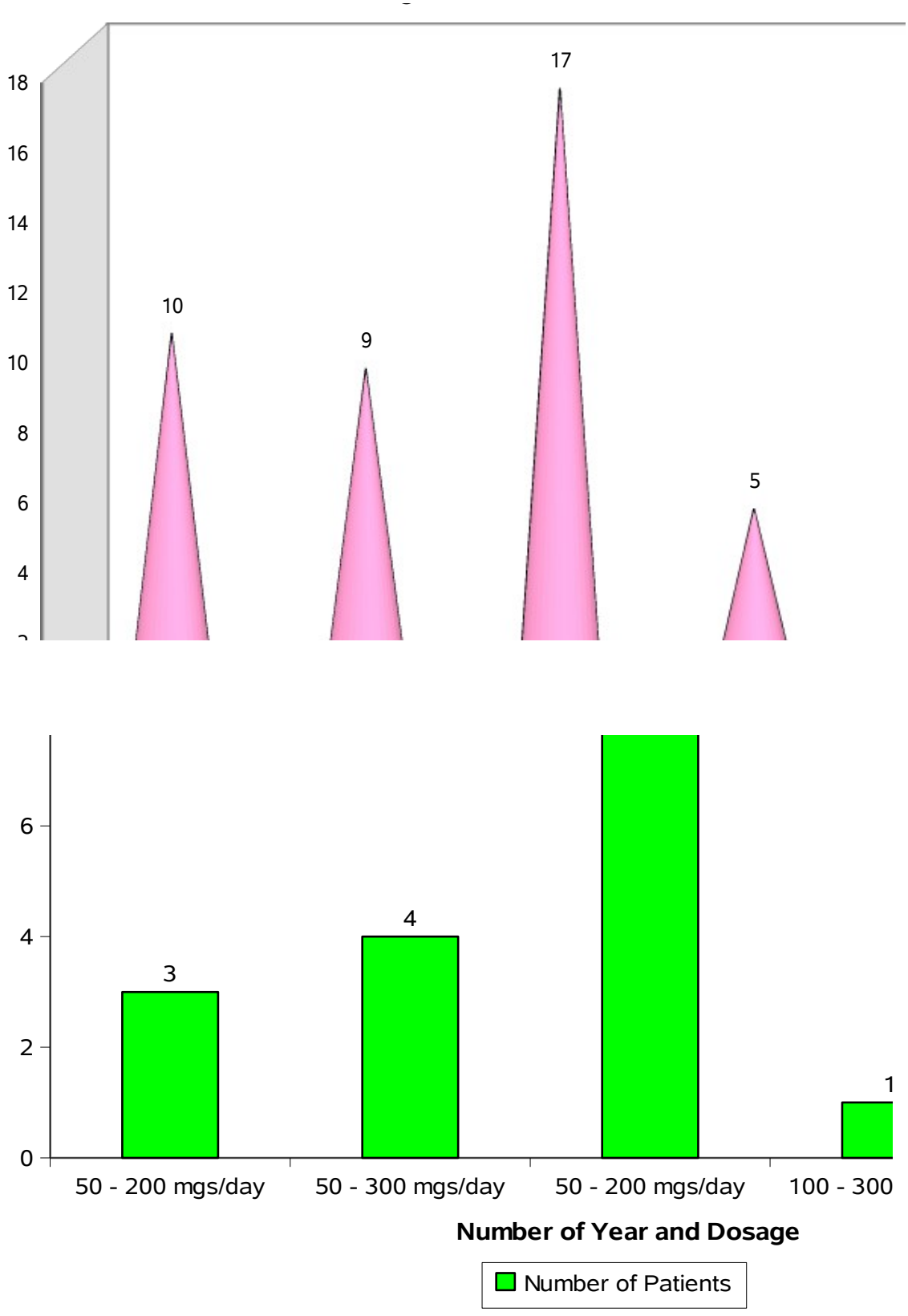
21


100 - 200 mgs/day
100 - 200mgs / day
100 - 300 mgs/day
10 - 15 years
5 - 10 years
2 - 5 year
9


18
16
14
12
10
8
6
4
10
9
17
5
6
4
2
0
3
4
1
50 - 200 mgs/day
50 - 300 mgs/day
50 - 200 mgs/day
100 - 300
Number of Year and Dosage
Number of Patients